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## THE MOULTS AND PLUMAGES OF THE SCOTERS,—GENUS OIDEMIA.

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*Plates XXIV–XXX.*

THE Scoters are a group of sea-ducks best known when adult by their black plumage and bright colored, bulging bills. They are widely distributed during the breeding season in the arctic and sub-arctic portions of the Northern Hemisphere and move southward in the winter to temperate latitudes where they are found in great numbers. Three species, *nigra*, *fusca*, and *carbo*, are peculiar to the Old World, and three, *americana*, *perspicillata* and *deglandi* are found in the New, where along our Atlantic coast they are popularly known to many of our gunners as "Coots."

Historically considered the Scoters are of respectable antiquity, for the very early writers on birds have had something to say about them. In 1555, Belon (L'Hist. Nat. Oyseaux) seems to refer to a sea-duck, and in 1560, Gesner (Icon. Animal., p. 76) mentions "*Anas fera fusca*" but at best fourteenth century descriptions are too vague and imperfect to make much out of them. In 1634, however, Aldrovand (Ornith., iii, p. 234) not only describes the common European species *fusca* under the title "De anate nigra, rostro nigro, rubro & luteo" but also inserts a strange-looking wood-cut of the duck with the white wing band and eye-crescent

most conspicuous. In 1650–1653, Jonston (Nat. Hist. Avium, p. 98) mentions this bird which he figures on plate 49 with a white wing band, calling it "*Anas fusca fera*," but the first author recognizing two species seems to have been Willughby (Ornithol. 1676). At p. 363 he proposes the name "Velvet-Duck" for "Aldrovandus his black Duck," reproducing the latter's wood-cut on plate LXX, and calling the bird "*Anas niger major.*" He describes a second species at p. 280 which he calls "*Anas niger minor*," figuring it on plate LXXIV, and this is evidently what is known as *nigra* today. In 1713, Ray (Synop. Avium, p. 141) describes "*Anas niger*" (= *fusca*) and "*Anas niger minor*" (= *nigra*) and in 1746 Linnæus (Fauna Suecica, p. 38, Nos. 106, 107) describes "*Anas fusca*" and what seems to be an immature *nigra*, but like most of the old writers much is made of the unimportant characters which are shared by many birds, and the real differences are completely missed. This failing, however, I am sorry to say is not confined entirely to the pioneers in ornithology.

In 1750, Edwards (Nat. Hist. Birds, iii, p. 155) describes the "Great Black Duck from Hudson's Bay" which his colored plate — the first of any Scoter — shows is *perspicillata*, and in 1758 Linnæus (Syst. Nat. i, pp. 123 and 125) gives the names "*Anas fusca*," "*Anas nigra*" and "*Anas perspicillata*" to the three species that retain his specific names to this day. In 1760, Brisson (Ornithologie, vi, pp. 420–427) describes at considerable length the three species as "*Anas nigra*" (= *nigra*), "*Anas nigra major*" (= *fusca*) and "*Anas nigra major Freti Hudsonis*" (= *perspicillata*) and many later writers might be cited. It would be out of place to review their statements in this brief sketch for a volume could be filled correcting and explaining the many blunders that have been made. My chief object is rather to clear up such obscurity as still remains. It may be of interest, however, to call attention to the fact that the two American species of Scoters were long confused, *americana* with the European *nigra* and *deglandi* with *fusca*, and not until 1831 did Swainson and Richardson (Faun. Bor. Amer., ii, p. 450) recognize *americana* as distinct, while it was 1850 when Bonaparte (Rev. Crit. Orn. Europe, p. 108) separated *deglandi*. Finally, *carbo* was recognized as a full species in 1887 by Ridgway (Man. N. Am. Birds, p. 112) under the name *stejnegeri*. There are therefore in all

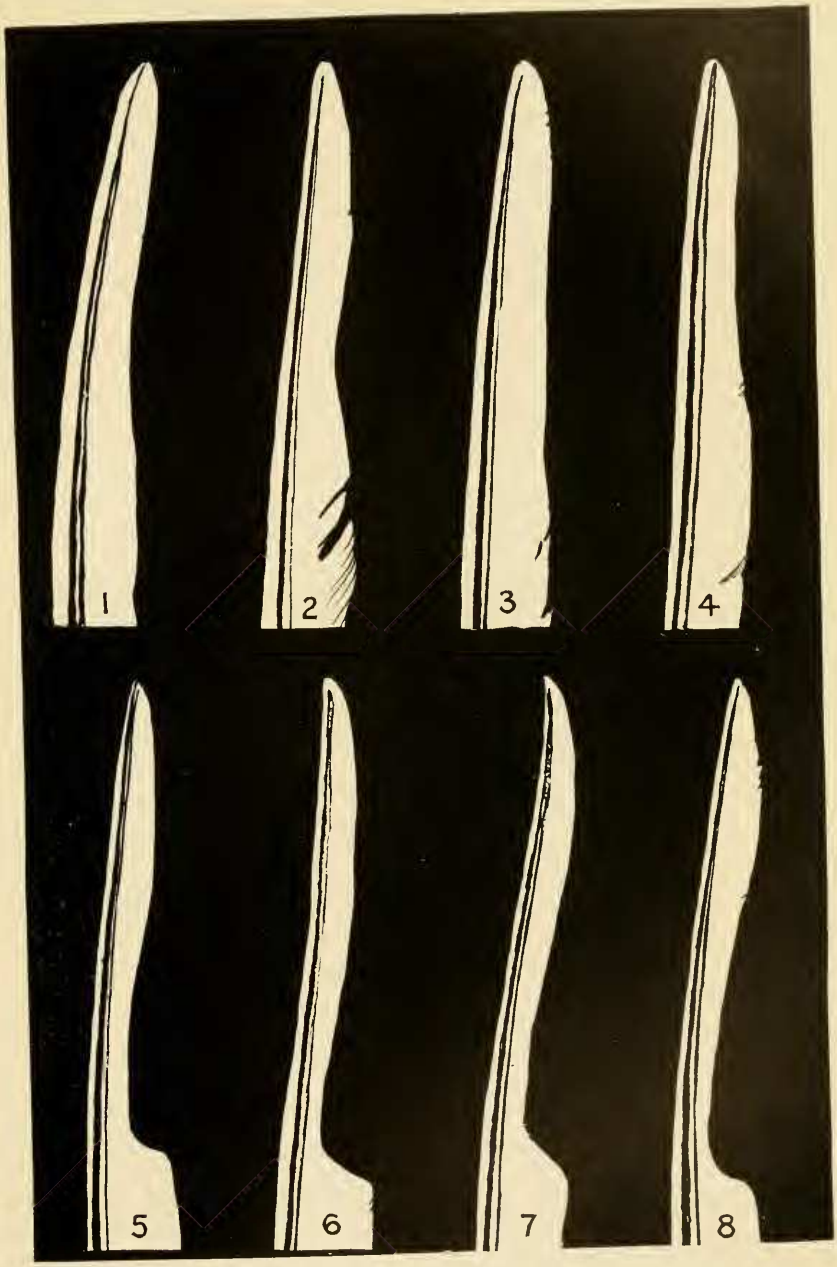
six species in the genus *Oidemia*, the heads of which (Plate XXIV) have been drawn and colored true to life and in most cases from fresh birds by Mr. Henry Thurston. The feathering of the bills is diagnostic of each in all plumages.

The question of genera need not detain us long. I am not one who believes in making generic distinctions so fine that nothing is left except monotypic groups and it seems to me that there should be some difference between a genus and a species. Unless we recognize the six species now in *Oidemia* as congeneric, there should be six genera. Fleming (Philos. of Zool., ii, p. 260, 1822) established the genus *Oidemia* (later spelled *Œdemia*) and although five other genera have since then had more or less vogue, there seems no good reason for recognizing any of them.

In view of all that has been written about the Scoters during the many years that they have been known to ornithologists, it would seem superfluous to add to a literature that already seems replete were it not that very little has been published bearing directly upon the moult itself and the way that it is related to plumages. Over a dozen years ago I took up the study of the moult of the Scoters making use of specimens that were freshly killed. In this way it has been possible for me to follow the plumage changes much more accurately than merely with dried skins and now with the large series at hand that were first so studied, I am prepared to show some new facts and correlate a good many others that have been imperfectly understood. My own collection includes the following specimens, viz. *Oidemia americana*, 18 adult males, 6 adult females, 10 young males and 3 young females; *O. perspicillata*, 23 adult males, 6 adult females, 21 young males and 10 young females; *O. deglandi*, 23 adult males, 9 adult females, 10 young males and 22 adult females; *O. carbo*, 2 adult males; *O. fusca*, 3 adult males; and *O. nigra*, 3 adult males, 1 young female, and 1 downy young. The bulk of my specimens came from Long Island, New York, but besides my own birds I have examined fully as many others in other private and public collections kindly placed at my disposal. As a consequence I have had no dearth of material except perhaps of breeding birds, and have been able to piece out very complete series of most of the species, representing every month in the year.

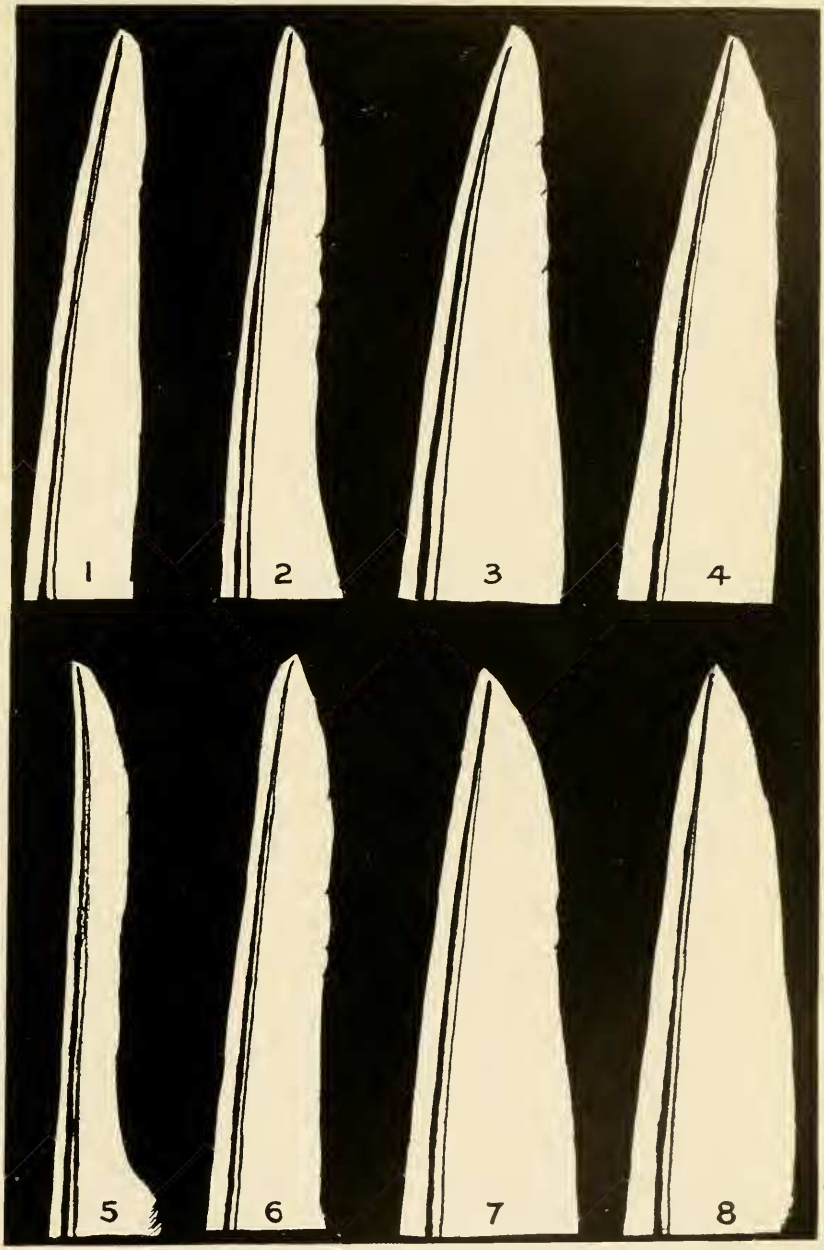
The question is sometimes asked: How may the age of ducks be determined? There are several ways of approximating this in wild birds. Of course young birds show several skeletal characters that persist for many months, but the plumage — once it is known — gives us the clue that lasts the longest. It is singular that none of our American authorities since Nuttall in 1834 has ever made mention of the important emarginate first, or distal primary of adult males of *americana*, nor have foreign writers on the moult of *nigra* recognized its value. The like feather in young birds of this species is of quite a different shape, a fact of importance because, until a bird is a year old, the primary marks him as a young bird no matter what sort of plumage he may assume. For the reason that neither this nor the other primaries in ducks are moulted more than once in a year this one feather is a key to the many so called "immature" plumages. I have illustrated (Plate XXV) the differences between the tapering feather tip in young males (Figs. 1–4) and the cut or emarginate tip in adults (Figs. 5–8). The same condition prevails in the European species *nigra* as shown by Plate XXVI (Figs. 1 and 5) where, for comparison, I have also placed male *perspicillata* (Figs. 2 and 6), *deglandi* (Figs. 3 and 7), and *fusca* (Figs. 4 and 8) young and old. I have also added Plate XXVII making a similar comparison between young and adult females of *americana* (Figs. 1 and 5), *deglandi* (Figs. 2 and 6), *fusca* (Figs. 3 and 7) and *perspicillata* (Figs. 4 and 8). This method, which consists of holding the feather over blue-print paper, might be called an avian Bertillon system with wing tips instead of fingers for identification, and I feel confident that it may hold some future possibilities. While a great variation is here shown by the wing prints it should be noted that even where the differences between the young and the adult bird overlap, there is a tendency for the adults of the Scoters to have larger, wider feathers, with the exception of *americana* and *nigra* which alone have the singular cut or emarginate primary in the adult.

As the moults of all the Scoters of the New World, and probably those of the Old are the same and the sequence of plumages identical, a better understanding of them may be obtained by taking them up in natural sequence. The growth of new feathers always begins at definite points, just as it does in other birds, and extends



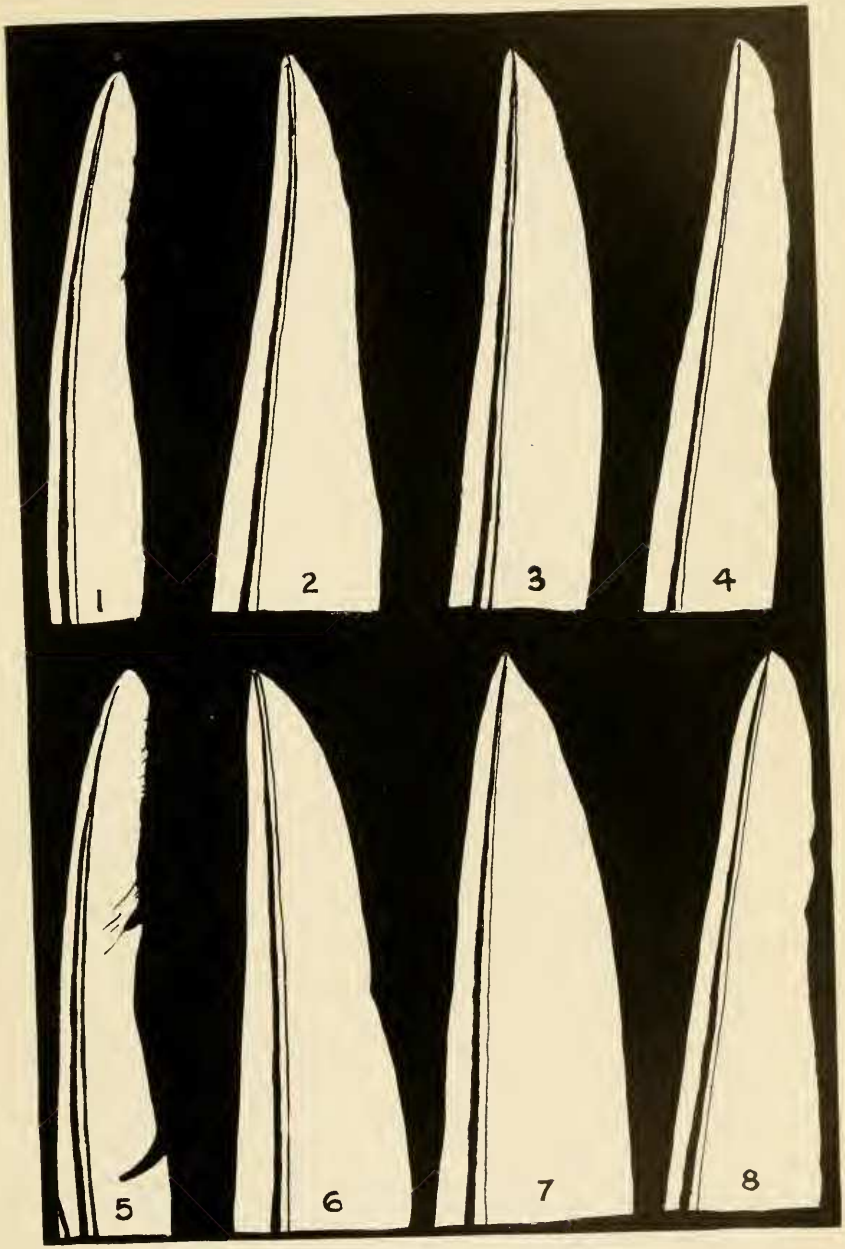

DISTAL PRIMARIES OF OIDEMIA AMERICANA.

Young males, Figs. 1–4. Adult males, Figs. 5–8.




DISTAL PRIMARIES OF MALES.

| | | | | | |
|---|---|---|---|---|---|
| *Oidemia nigra*, | young male, | Fig. 1; | adult, | Fig. 5. |
| " *perspicillata*, | " " | Fig. 2; | " | Fig. 6. |
| " *deglandi*, | " " | Fig. 3; | " | Fig. 7. |
| " *fusca*, | " " | Fig. 4; | " | Fig. 8. |




DISTAL PRIMARIES OF FEMALES.

| | | | | | | |
|---|---|---|---|---|---|---|
| *Oidemia* | *americana*, | young female, | Fig. 1; | adult, | Fig. 5. |
| " | *deglandi*, | " | " | Fig. 2; | " | Fig. 6. |
| " | *fusca*, | " | " | Fig. 3; | " | Fig. 7. |
| " | *perspicillata*, | " | " | Fig. 4; | " | Fig. 8. |

along definite paths. This shows clearly in the Scoters where the black feathers of the head begin to show chiefly anteriorly and the moult moves slowly backward, leaving a gap on the neck before it joins the spot on the breast and back where a similar backward movement has been in progress (Plate XXVIII, Fig. 2; XXIX, Fig. 2; and XXX, Fig. 2). Feather growth next extends along the sides and flanks and the last area to be affected by a moult is the middle part of the abdomen (Plate XXVIII, Fig. 3; XXIX, Fig. 3; and XXX, Fig. 3), although in the downy chick this area is clothed before the wing-quills sprout.

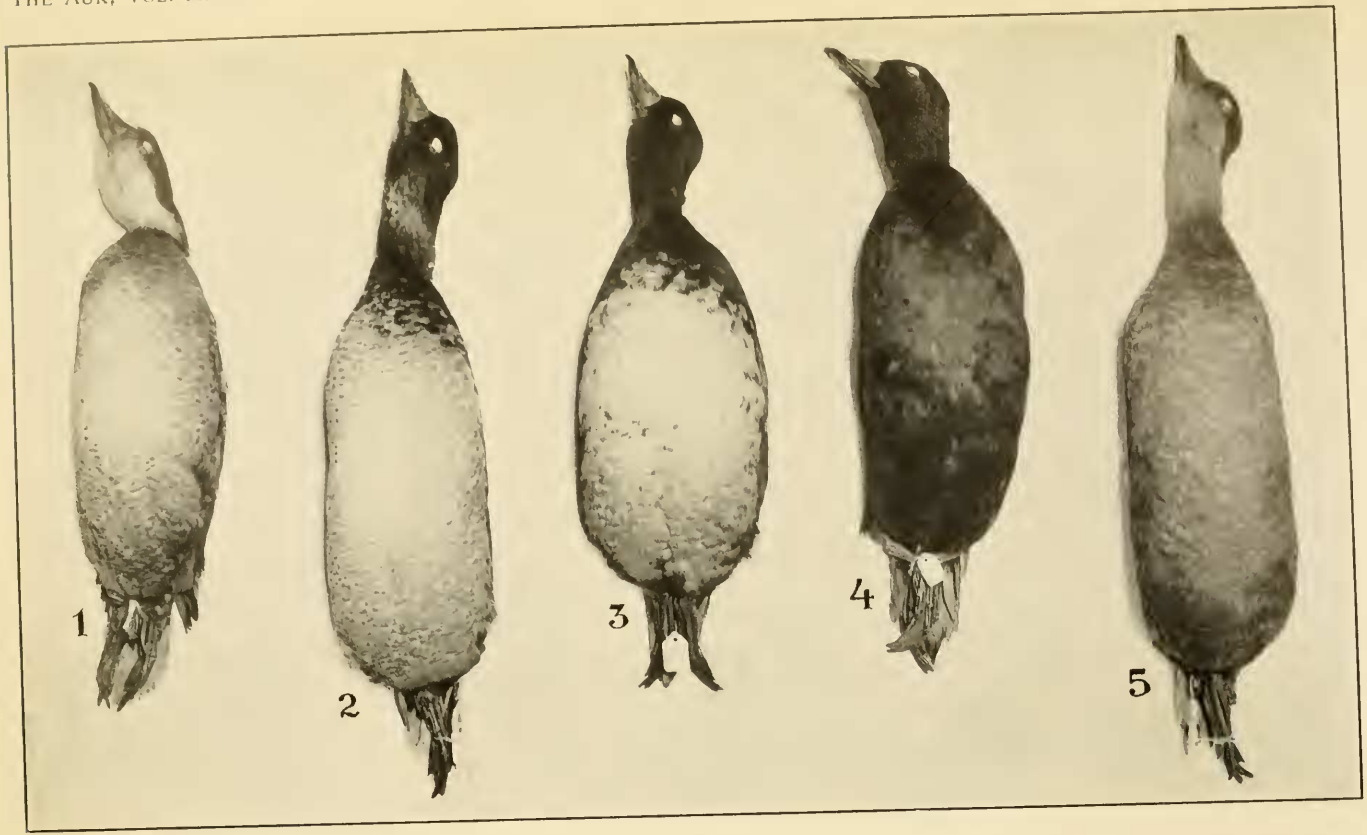
There is no haphazard growth. Moult may be delayed, especially in females, or it may be checked in some young birds before it has extended as far as it does in others, but birds of the same age have approximately the same plumages. The difficulty has always been to classify plumages and moults by name, and this is particularly difficult in the Scoters because there is no month in the whole year when some individuals may not be found moulting. Especially is this true of young birds arriving from the northern breeding grounds, in full juvenal plumage, some showing the growth of a few winter plumage feathers in October and others being no farther advanced in March. Furthermore some males have become largely black by January while others are at a similar stage in April, so that young birds may be found in active moult throughout the entire winter. Specimens examined when freshly-killed show many pin feathers that easily escape notice in skins and I am convinced that there are two moults concerned in the changes of the first winter, a partial postjuvenal and a partial prenuptial. Both produce black feathers in the male and brown ones in the female, but where one leaves off and the other begins it is impossible to say. As we find new black feathers among old black ones we may assume such birds have undergone two moults, but as a rule we find new black among brown feathers only which indicates the postjuvenal moult and the growth of first winter feathers. When such growth occurs in spring birds however it seems rather absurd to call them first winter feathers rather than first nuptial, but we must either do this, consider the first winter plumage suppressed in some individuals, or consider the postjuvenal moult as aborted and its place taken by the prenuptial. It is merely a question of what

is the best way of expressing facts and as the stages of moult and of plumage overlap and it is simplest to draw an arbitrary line somewhere.

During the first winter, the knobs and bulgings of the bills of males gradually appear as well as the colors that are peculiar to them and to the legs and feet. The iris, brown in all females, in all young birds of both sexes and in the adults of *americana* and *nigra*, in males becomes pale yellow during the winter and by the end of the year white in *deglandi*, *carbo*, *fusca* and *perspicillata*. After the complete first postnuptial moult in August, young birds are scarcely distinguishable from adults, although in some the plumage is not so black and the bills are less bulged. From now on adults, both male and female, not only have a complete postnuptial moult each August or September, when through simultaneous loss of all the wing-quills, they lose the power of flight, but they also undergo a partial prenuptial moult in March and April which involves the body plumage and the tail, never the remiges of the wings. I have yet to see an adult bird of any of the species taken in the spring which is not in active moult, and that this stage of moult should have been completely overlooked is a matter that may well surprise us. I do not find evidence of any eclipse plumage in the Scoters as is claimed by a recent writer, a point to be discussed later. With these preliminary remarks which apply indiscriminately to any of the Scoters, we may take up each species in turn and show the development of its plumages and moults. I cite by number only such specimens as seem worthy of special notice in order to fix a day or to emphasize a fact.

## Oidemia americana.

*Natal Down.* The only specimen examined (Am. Mus. No. 76845, Gichiga, N. E. Siberia, Aug. 17) is one about half grown and it already has acquired some of the juvenal plumage. The bird seems to be indistinguishable from a younger specimen of *nigra* (J. D., Jr. No. 30919, July 30) from Norway. It is dark brown above and lighter below, an indistinct collar separating the breast from the still whiter chin and throat; a dark brown cap is indistinctly outlined foreshadowing that of the next plumage. The




OIDEMIA AMERICANA.

Fig. 1. Juvenal plumage, male and female. Figs. 2 and 3. Juvenal plumage plus first winter, male.
Fig. 4. Adult male. Fig. 5. Adult female.

wing-quills are just showing with the down still adherent at their apices. The tail is grown and much worn illustrating the fact that in the duck, a water fowl, the tail develops earlier than do the flight feathers which is contrary to the order of moult in land birds. The scapulars and breast feathers are partly grown.

*Juvenal Plumage* (Plate XXVIII, Fig. 1), acquired by a complete post natal moult, and in this dress the sexes are alike although females average a little smaller in most of their measurements. It is unsafe without dissection to attempt to distinguish the sexes until feathers of the first winter plumage begin to appear together with the later changes in the color and form of the bill in the male. Young males arriving from the north in October (J. D., Jr., No. 9798, Oct. 26) and in early November (J. D., Jr., No. 4716, Nov. 8) soon begin to show a scattered growth of black feathers and later the females show brown feathers but the juvenal dress may be worn in some cases for several months before the postjuvenal moult sets in. A spring female (J. D., Jr., No. 4867, March 4), for example, is wholly in juvenal plumage with merely a few new feathers begining to appear. *O. nigra* and *americana* are practically alike in this plumage, being brown above with a dark cap and lighter below, but the bill of *nigra* is rather heavier; *deglandi*, *carbo*, *fusca* and *perspicillata* are brown above, lighter below and show two large white spots on the side of the head, and *deglandi*, *carbo*, and *fusca* have white wing patches.

*1st Winter Plumage* (Plate XXVIII, Figs. 2 and 3), acquired by a partial postjuvenal moult which never includes the wings and seldom the lower surface of the body. At most the head, neck, back and sides become black in males and a much less extensive growth of brown feathers occurring relatively later takes place in females. The tail too is moulted, the rectrices showing irregularities in their replacement. The moult probably progresses slowly but it must be remembered that in the winter while we see individuals in all stages no doubt they begin to moult at widely different dates and it is impossible to say just how long any one bird has been actually moulting. I am convinced that males which are well advanced by January, also undergo a prenuptial moult in April or May, like adults, but it is difficult to tell whether the specimens which are moulting at this late period are undergoing a much

delayed postjuvenal or a distinct prenuptial moult. The results are the same so far as the plumage is concerned, the new feathers being black in each case, but, if there be a prenuptial moult, three different generations of feathers can be found while as a rule only two are demonstrable. The most developed specimen I have seen (J. D., Jr., No. 4412,♂, April 20), is almost wholly black except the wings and a few scattered brown feathers on the abdomen and the back, but we have no means of knowing how many birds reach this advanced stage — probably very few. The abdomen, as a rule, becomes darker anteriorly and posteriorly as the feather edgings are narrower here and sooner show the dark basal part as they wear off and the fading is considerable.

Shortly after new feathers appear, the bill of the young male begins to take on the colors of the adult and still more gradually assumes its shape. The colors may closely approximate, by the end of the winter, those of the adult, but the shape is not perfected for at least a year, the swelling of the hump not being marked in the first winter birds although the yellow color may be brilliant. The bill of the female and the legs and feet of the male remain dusky, adults differing very little from young birds.

No matter how black the plumage may be nor how bright the colors of bill or feet, young males may infallibly be told from adults by the shape of the first primary (Plate XXV) which is not replaced until the first postnuptial moult. The iris in *americana* is always brown in both sexes at all ages.

*1st Nuptial Plumage.* This is either the first winter plumage plus more or less wear, being therefore a mixture of much worn juvenal and less worn first winter feathers, or it is, in part, the result of a first prenuptial moult. It is pretty well established from observations on birds in captivity that no ducks breed until their second year.

*2d Winter Plumage,* acquired by a complete first postnuptial moult. It is probable that this moult begins in July, but a lack of specimens prevents me from giving exact dates. A specimen of Dr. L. B. Bishop's (No. 557, August 28) is a male that has nearly completed this moult and acquired the emarginate primary. There are enough worn brown juvenal feathers remaining to show that the bird never had assumed much of the first winter dress. As a